CLAIMS

1. Ultrasound detector or emitter apparatus comprising a substrate 20 having a movable polymer membrane 24 attached to it, and a single chamber 26 defined between the membrane 24 and the substrate 20, the membrane 24 and the substrate 20 in the region of the chamber 26 each having a respective electrical contact pad 34,36, the arrangement being such that relative movement between the contact pads 34,36 is either indicative of incident ultrasound, or causes ultrasound to be generated.

2. Apparatus according to claim 1 in which the substrate 20 is a semiconductor.

3. Apparatus according to claim 2 in which electronic circuitry is provided in the semiconductor substrate 20 either (i) to read out signals from the membrane and substrate pads, or (ii) to drive the pad on the movable polymer membrane, or both (i) and (ii).

4. Apparatus according to ~~any preceding claim~~ claim 1 in which there is only a single membrane 24 or layer of polymer material.

5. Apparatus according to ~~any preceding claim~~ claim 1 that is fabricated using an IC compatible process, including using IC compatible metal electrode materials.

6. Apparatus according to ~~any preceding claim~~ claim 1 in which the pads 34,36 have no CMOS incompatible materials, such as gold.

7. Apparatus according to ~~any preceding claim~~ claim 1 which comprises structural assessing apparatus adapted to test a structure for damage.

A 8. Apparatus according to ~~any preceding claim~~ claim 1 which comprises a membrane 24 of no more than 3 μm thickness extending over the chamber 26.

A 9. Apparatus according to ~~any preceding claim~~ claim 1 in which the movable membrane 24 is not formed in a single plane.

A 10. Apparatus according to ~~any preceding claim~~ claim 1 in which the movable membrane 24, which moves in use in response to incident ultrasound or which generates ultrasound, has a central portion 28 and at least one side portion which is not in the general plane of the central portion 28.

A 11. Apparatus according to ~~any preceding claim~~ claim 1 that has a bandwidth of at least 1 MHz (6dB bandwidth).

12. An array of transducers, each transducer comprising a semiconductor substrate 20 and a movable polymer membrane 24, there being a chamber 26 defined between the movable polymer membrane 24 and the substrate 20, with electrical pads 34,36 associated with the regions of the substrate 20 and movable membrane 24 that define the chamber.

13. An array according to claim 12 in which at least some of the transducers resonate at frequencies that are substantially different.

A 14. An array according to claim 12 ~~or claim 13~~ including at least some chambers 26 which are connected by passageways.

15. An integrated semiconductor device having apparatus in accordance with any ~~one of claims 1 to 11~~ claim 1 provided on a semiconductor substrate and a signal processor or signal modifier provided on the same semiconductor substrate, integrating the processor and the transducer in the same device.

16. A method of producing an ultrasonic transducer comprising applying a sacrificial material to a substrate, applying a polymer coating over at least part of the sacrificial material and the substrate, and removing at least part of the sacrificial material to leave a portion of the polymer coating defining a movable member wherein the member defines a part of a single cavity, and in which the polymer is applied in a mobile state.

17. A method according to Claim 16 in which the polymer coating which defines the movable member is applied over substantially the whole of the sacrificial material and contacts the substrate around the cavity.

18. A method according to Claim 16 ~~or Claim 17~~ in which the polymer coating is applied at a thickness so as to produce a movable member that is of the order of 2 μm thick, or less.

19. A method according to ~~any of claims 16 to 18~~ claim 16 in which, as the polymer is applied in a mobile state, the sacrificial material assists in defining a non-flat shape of a movable polymer membrane, and which further comprises removing the sacrificial material after the shape of the movable polymer member has been established.

20. A method according to ~~any one of claims 16 to 19~~ claim 16 in which the substrate is a semiconductor material.

21. A method according to any ~~one of claims 16 to 20~~ claim 16 comprising applying a top contact pad material onto the top of the membrane, and etching the material through a mask to define a top contact pad.

22. A method according to ~~any one of claims 16 to 21~~ claim 16 which comprises producing an array of transducers on the same substrate.

23. A method according to Claim 22 which further comprises ensuring that there are transducers in the array which respond to different frequencies.

24. A method according to ~~any one of claims 16 to 23~~ claim 16 which further comprises providing an integrated semiconductor device having the transducer and having signal processing means provided on the same substrate.